



Identification and assessment of KPIS in cooperative based dairy-food supply chains: a SCOR approach

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General Note



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ABSTRACT

Measurement of supply chain performance has become inextricably important for any manufacturing or service based firm across industries to keep track of its performance. There are two ways how a supply chain performance can be measured, namely - fact based performance measurement and perception based performance measurement. In both cases "data" from respective stakeholders of a supply chain can be gathered either through a structured questionnaire using scales (perception based) or collecting data from various records available with the respective stakeholders (fact based) on supply chain operations. Supply chain operations reference (SCOR) predominantly covers the metric required for measuring and improving a firm's performance. Nevertheless, firms have their own measurement yard-stick by which they assess their performance and make improvements in certain parameters for better supply chain profitability. In this paper the measurement of the supply chain performance in the dairy industry has been done using SCOR metrics (fact based) and necessary key performance indicators (KPIs) have been highlighted indicating the concerns need to be addressed in future. The KPIs are analysed thoroughly with their pros and cons and remedies are

suggested to overcome the cons. As there are various stakeholders in the dairy-food supply chain who work solely for the supply chain and have least/no flexibility to devote their time for some other accomplishments, it is believed that their performance measurement is as important as firm's performance measurement. Hence, KPIs are identified at each stage and assessed depending upon various criteria related to dairy food supply chains.

Keywords – SCOR, KPIs, dairy-food supply chain, empirical paper

1. INTRODUCTION

Supply chain performance measurement has been an imperative organisational activity to keep track of the various process flows across the systems. The changing nature of demand, competition and work essentially has propelled the supply chain for performance measurement (Neely, 1999; Huang et al., 2004). The fundamental objective of supply chain performance measurement system is to aid-in strategy implementation through a formal, systematic approach to monitoring and evaluating various activities. Managers can use an effective blend of financial and non-financial information to achieve the goal. Improved decision making, improved level of communication and identification of flaws are some of the major benefits that can be achieved if measurement of supply chain performance is done on a regular basis. But sometimes due to conflicting messages from the stakeholders and lack of congruence in the objective formulation the measurement can't retrieve the facts of the supply chain (Monczka et al., 2002). As the supply chain is a bonding of several stakeholders, how a change or lack of performance affects its overall performance is cited in the following paragraph.

The dairy industry in India is predominantly owned/controlled by the cooperatives at the State levels e.g. Anand Milk Union Limited (AMUL) of Gujarat, the major cooperative based dairy-food supply chain, is managed by Gujarat Cooperative Milk Marketing Federation (GCMMF). There are about 15 such federations in India, mostly in major states of India. The dairy industry which provides perennial source of income to all its stakeholders is highly vulnerable to some of the major challenges. For an instance, if the production per cow per annum (yield) is drastically low then the repercussions are manifold. The supply chain would be unable to meet the demand of its products and many of its stakeholders would be operating at a sub-optimal level of performance. The foremost stakeholder, who would be suffering out of it, is the dairy farmer. If the yield is low, then the cost of production at this level would be higher and the farmer will be ending up with low profit or sometimes no profit. Being affected negatively for several months he/she might stay away from producing milk which has a serious impact on the procurement of the supply chain if practiced on a large scale. In a country like India where the industry is predominantly managed by the cooperative based dairy federations, customers have great faith on these brands even though private brands are available in the market place. Keeping in view to these issues, it has become imperative to measure the performance of the supply chains with the requisite KPIs and suggest necessary remedies to overcome the barriers for better performance.

2. LITERATURE REVIEW

Performance measurement is the process of quantifying the effectiveness and efficiency of various actions. While efficiency is the measure of economic activities of the farm there the effectiveness is the extent to which customers' requirements are met. The balanced score card method, performance measurement matrix and survey through questionnaire etc. are some useful ways to measure performance of a farm (Neely et al., 1995). Sometimes in order to improve the supply chain performance it is essential to compare it with the other best performers in the field (benchmarking). It can be used both internally and externally where internal benchmarking is to develop the inferior departments in the organization and the external benchmarking is to compare with the other organisations performing well (Camp, 1989; Splendolini, 1992).

The supply chain performance measurement has two facets namely the internal performance and the supply chain facing the customers at large. Without the loss of generality, the core principle that a supply chain follows or should follow "the delivery of the products at right time, right place, right quantity, right price and right quality (Simchi-Levi et al., 2008)". While we talk about the right quantity we also talk about the quantity demanded by the customers at large so as to avoid any product shortage. In the same way while we talk about the right quality we also talk about the safety and other quality parameters of the products as is desired or expected by a prospective/potential/existing customer. These are some of the fundamental issues a supply chain faces in its day to day operation and has to be viewed seriously (e.g. the payment system, cooperative ownership structure and vertically integrated nature of the industry etc.); (Sankaran and Luxton, 2003).

The success of the industries is not automatic unless due care has been given to the measurement of the supply chain in regular interval of time. There should be a common goal for the entire chain irrespective of the stakeholders – the goals could be customer

satisfaction and the enhanced competitiveness (Gunasekaran et al., 2004). Determining the variables for measuring performance of the key stakeholders of a supply chain is not an easy task. Mostly the attributes like efficiency, flexibility, responsiveness, innovativeness; product quality and process quality (Beamon, 1999a; SCOR, 2000; Gunasekaran et al., 2004; Aramyan, 2007) with varying degrees are used to measure the performance of the supply chain.

Supply chain performance indicators viz. efficiency, responsiveness, flexibility, product quality and process quality are all indispensable part of the supply chain. However, the flexibilities like volume, delivery, system, supply, organisational and information flexibility are some of the major sub-indicators which influence the overall performance of the supply chain. The higher is the ability of the firm to change its production and delivery to the customers (as a part of the flexibility) the higher is the value addition to the total supply chain profitability (Vickery et al., 1999; Duclos et al., 2003; Garavelli, 2003; Bozarth and Handfield, 2006). For measuring the performance of logistics and supply chain it is essential to include both financial and non-financial terminologies. Costs, profits, return on investment (RoI) etc. are the financial measures whereas productivity, asset management, order fulfilment and quality are the non-financial measures. Both of these financial and non-financial measures are pertaining to the internal indicators whereas customer perceptions, service quality, reliability, responsiveness, relationship, learning and innovations are the external measures. In order to measure the performance of the logistics both of internal and external measures are important (Kaplan & Norton; 1996; Sople, 2004). Slack and Lewis (2009) have suggested six indicators to measure the operational performance in the organisation. As per them:

- Quality: no. of defects per unit, level of customer complaints, scrap level, warranty claims, mean time between failures and customer satisfaction score etc.
- Speed: customer query time, order lead time, frequency of delivery, actual versus theoretical throughput time and cycle time
- Dependability: percentage of orders delivered late, average lateness of orders, proportion of products in stock, mean deviation from promised arrival and schedule adherence
- Flexibility: time needed to develop new products or services, range of products or services, machine change-over time, average batch size, time to increase activity rate, average capacity or maximum capacity and time to change schedules
- Cost: minimum delivery time or average delivery time, variance against budget, utilisation of resources, labour productivity, added value, efficiency, cost per operation hour.
- Process knowledge: the process improvement is like a journey where there is always a scope for further improvements

Table 1 Types of supply chain and their measurement

Types of supply chains	Supply chain performance		
	Supply chain measure	Supply chain sub-measure	Supply chain metric
Efficient	Cost, price (market winner)	Total chain cost Purchasing price	USD/purchased item
Quick/Agile/ Market responsive	Delivery	Delivery reliability	Percentage
	Quality	Quality conformance	PPM
	Flexibility (market winner)	Flexibility (mix) of production	Percentage
	Cost	Total chain cost	USD/purchased item
Lean	Primary: cost (market winner), quality Secondary: delivery, novelty, customer service	Total chain cost	USD/purchased item
		Purchasing price	PPM
		Quality conformance	Percentage
		Delivery reliability, Delivery (lead time)	Weeks
Hybrid (lean & quick/agile/market responsive)	Quality	Quality conformance	PPM
	Delivery	Delivery reliability	Percentage
	Cost	Total chain cost	USD/purchased item
	Flexibility	Purchasing price	Percentage
		Flexibility (mix) of production	

Source: Christopher and Towill (2000)

There are various models of performance measurement existing which depend upon the nature of the product the supply chain deals in. According to Fisher (1997) the type of product (functional or innovative), demand, product life cycle, competition and lead time to get it delivered etc. are some of the major attributes deciding how the supply chain should be positioned. Above are described the performance measures for various supply chains.

According to supply chain operations reference (SCOR) the supply chain has four major functions namely - plan, source, make and deliver. Planning is the basic principle of any business concern followed by sourcing where the raw materials are procured and transformed into products and services by a proper throughput. Once the product or service is in its finished form of consumption or delivering, it is delivered to the prospective customers. The whole process comes through certain stages. While the planning is done at the strategic level; sourcing is done at the tactic level. Making and delivering of the same is performed at the operational level of the supply chain. There are basically eight different parameters of supply chain performance, based on the SCOR model, (a) cost (b) inventory turnover (c) quality (d) lead time (e) delivery precision (f) internal performance (g) customer satisfaction and (h) service grade (Huang et al., 2004). The benefits of integrated supply chain management are manifold (see table below).

Table 2 Benefits in integrating the supply chain

Benefits	Range (%)	Remark
Delivery performance	16-28	Improvement
Inventory reduction	25-60	Improvement
Fulfilment cycle time	30-50	Improvement
Forecast accuracy	25-80	Improvement
Overall productivity	10-16	Improvement
Lower supply chain costs	25-50	Improvement
Fill rates	20-30	Improvement
Improved capacity realization	10-20	Improvement

Source: PRTM (1997) as said in Stephens (Supply Chain Council Report)

But there are some bottlenecks in performance measurement broadly (a) inability in applying the right metrics to manage the supply chain (b) difficulty in prioritizing supply chain improvement efforts (c) complexity of supply chains.

3. BACKGROUND AND OBJECTIVES

Initially, we will analyse the variables influencing the individual component performance and then will identify a set of variables required to be strengthened at the aggregate level of the supply chain so as to improve its performance. The study is intended to identify and assess the important variables which influence the supply chain performance at aggregated level. The aggregate level is nothing but evaluating whether the supply chain is performing "all that" it is supposed to do? Fundamentally this could be:

- Whether the supply chain is delivering right quantity of products irrespective of its product lines?
- Whether the supply chain is delivering the right quality of products?
- Whether the supply chain is delivering the products at the right place?
- Whether the supply chain is delivering the products at the right time?
- Whether the supply chain is delivering the products at the right price?
- Whether the supply chain is able to control its internal costs effectively (total supply chain costs versus individual component cost)?
- Whether the supply chain is able to make profit (total supply profitability versus individual component profit)?
- The performance of the supply chain is measured from view point of SCOR and finally remedies are suggested for low performance indicators.

4. CONCEPTUAL FRAMEWORK

The cooperative based dairy system in India has six major stakeholders where transport services are mostly outsourced to 3PLs (see dairy food supply chain figure below). Broadly there are five major dimension talked in the study upon which the supply chain performance is measured. They are namely – efficiency, flexibility, responsiveness, product quality and process quality. The following are the descriptions of the terminologies:

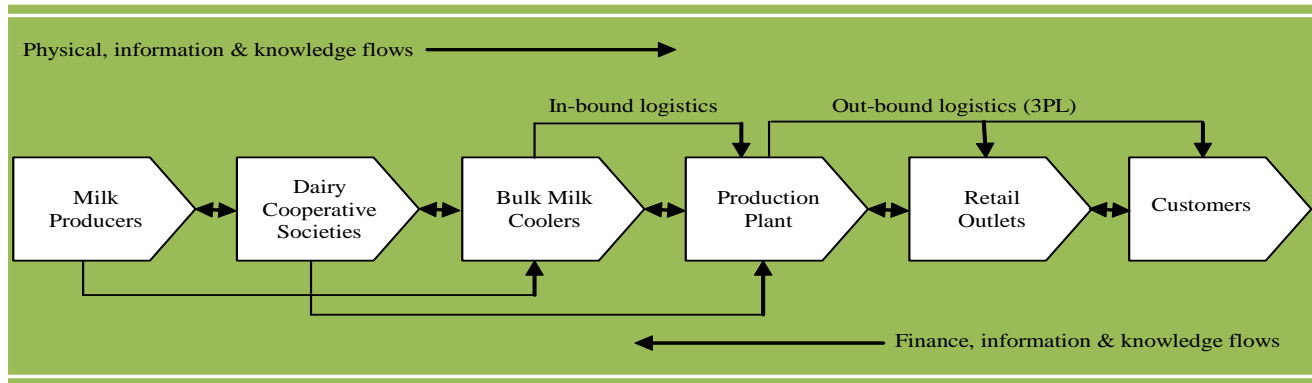


Figure 1 Cooperative based dairy-food supply chain (Source: Preliminary survey results).

4.1. Efficiency - In Terms of Cost and Profit

Efficiency of a firm is measured in terms of cost and profit. If the cost is higher than the sales then there is no scope for profit and hence the return on investment is negative or low. Under the efficiency head facility cost, transportation/transaction cost, inventory cost and the return on investment (RoI) are considered by giving due weightage to their suitability to a particular component. At the milk producer level the facility costs are measured in terms of cost of milk production where the fixed and variable costs are taken into consideration to calculate how much money is put in the process to produce one litre of milk. Since the milk producers stay close to the dairy cooperative society (DCS) the scope for incurring transportation cost is very limited. The preferred mode of transportation in their case is either walking or cycling. Inventory cost is also not an applicable parameter because the milk produced by them is delivered in specified time to the cooperative societies. For the DCS and BMC the facility costs are treated to be respectively the collection and chilling costs where the fixed and the variable costs are considered. Sometimes in the spreadsheets the depreciation of fixed assets has been taken into consideration. Here in both cases there is no scope for the inventory - due to very nature of perishability of milk it is hardly kept preserved at a certain stage. Even though it is stored for sometime at the BMCs after chilling it is insignificant except emergency cases. Both the in-bound and the out-bound transportations are taken care by the union on behalf of BMCs is found to be a significant cost. This is the apex organisation which is responsible for the procurement process.

For the production plant, the facility cost includes the various costs associated with procurement, "production and processing" and distribution. At this stage the inventory cost has been taken into consideration even though cost incurred on finished goods inventory is lower than the raw material inventory. Among the raw materials poly packs, skimmed milk powder (SMP), sugar, chemicals and other durable/semi-durable articles/materials are crucial and the inventory cost is basically calculated on them. Except the cost of processing of milk no other product costing is shared with the researcher. Based upon some literature and evidences from the cost of processing milk the items are concluded. According to the officials the costing is a susceptible issue and is basically not shared with outsiders. With great difficulty the costing of milk processing template has been obtained and made inferences thereto. Transporting agencies both fixed and the variable costs are taken into consideration where the basic investments are on the vehicles and costs incurred towards making the vehicles insulated/air conditioned to deliver the products without damage to the retail outlets. In their fixed costs, are like one time investment and the variables costs are the operating and trip related costs. For the retailers various costs which are incurred to make the sales possible are undertaken. Inventory and transportation related costs are found insignificant in their case. The RoI factor has been carried forward to measure financial performance of every stakeholder. Since the RoI is equal to the profit made throughout the year upon the investment in the business so in order to avoid redundancy only former is kept on roll.

4.2. Flexibility - The Ability to Change under a Certain Circumstance

In this aspect, customer satisfaction, delivery flexibility, volume flexibility, fill rate, back order and lost sales are taken into consideration. While customer satisfaction has got its usual meaning, delivery flexibility refers to the ability to change the delivery dates/times according to the requirement of the downstream and upstream members in the supply chain. In contrast, the volume

flexibility refers to the level of production/procurement/supply according to the need of the other members in the supply chain. In some cases while delivery flexibility has more importance in other cases volume flexibility is very useful even though both the concepts important. Back orders and lost sales are concepts which occur during the stock out situations. Back order is nothing but the amount of material which is not delivered as per the order of the customers but promised to be delivered when stock is available. Lost sales is the stock-out situation which refer to the market lost or demand lost during this period and there is no scope to fulfil the demand some other point of time.

In this particular discussion the whole procurement chain is out of scope of customer satisfaction as the downstream members are bound to purchase their produce or procurement. But for the production plant, retailers and the transporters it is vitally important since the concerned purchasing member has got a choice to shift for other avenues. The production of milk almost inflexible in the quantity and hence the volume is largely fixed which flows downstream. But the delivery system is bit flexible and hence the members do not hesitate to be abided by the change in delivery timings. For the retail outlets, production plant and the transport agencies it is extremely important to assess the quantity of products they can handle to manage the distribution chain. Except for the production plant and the retail outlets back orders and the lost sales are immaterial for others since there is no scope of stock-ins and stock-outs.

4.3. Responsiveness – The Ability to React to a Certain Circumstance

Fill rates, lead time, customer response time and customer complaints are the parameters used to measure the responsiveness in the supply chain. Fill rate is a crucial factor which is mostly used for measuring the demand filling rate - has been more or less referred by every component in this study even though there is no target fulfilment rate. The fill rate is not a concern for the transporting agencies while it is a concern for all other stakeholders in the supply chain. Lead time is the difference between the ordering date and the delivery date which influences the supply chain performance positively if shorter and negatively if longer. Customer response time and complaints are with their usual meaning and affect the supply chain depending upon their intensity – the lower the better. As stated earlier the fill rate of the procurement chain (e.g. MP, DCS and BMC) is the quantity delivered to the next phase from a particular phase. It may be noted here that there is no target given to this stakeholders. Production plant uses all the concepts of the responsiveness while some varying degrees of the same are being used by other stakeholders to know their degree of responsiveness to the market place.

4.4. Product Quality – The Ability to Provide Superior Products

Under the quality manufacturing head appearance, taste, shelf life, safety and reliability of the product are some of the extremely useful terminologies as the very nature of the raw material as well as the products are perishable which may be fatal if consumed in the damaged form. So the dairy food supply chain keeps into account all these parameters at every stage and due care is taken for production, processing and distribution of the same for delivering it fresh and safe. All the terminologies are quite clear in their literal meaning while the reliability of the products says about the deviations between the promised and the actual. Higher the deviations lower the reliability which brings up discontentment irrespective of the situations and stakeholders. Among all the components the production plant is entangled with these parameters while delivering the safety produce (milk) is an important criterion for the procurement chain members. It is seen that awareness of quality and safe milk production among the producer members are lacking which not only reducing their RoI due to lower price rather decreasing the food value requirement of the milk causing serious problems for the production plant for further processing. It is expected that the transporting agencies deliver the raw and processed milk (products) to the concerned stakeholders in the right state so that customer complaints of delivery of damaged products could be minimised. Retailers do not have any role to affect the quality of the products since they are meant to sell only delivered products from the production plant.

4.5. Process Quality – The Ability to Follow Standard Operating Procedure

Traceability, "storage and transporting conditions", working condition, chemical use, energy use, sales promotion, display in the shops/parlours and customer service are some of the important parameters considered for measuring the process quality under which a specific stakeholder operates. If the process quality is superior then the product quality will be superior under some specific conditions like superior raw materials, skilled manpower etc. Traceability is one of the most important criteria for having superior processing since the pre-requisite information and the whereabouts of the products can be known by this parameter. This is facilitated by the use of various information tools like barcodes, radio frequency identification (RFID) and global positioning systems (GPS). Though in this case the RFID and GPS are not being prevailed still the use of barcodes on the products are quite common to

convey the desired information of the manufacturer. To keep track of the logistics this is also quite important and the use of cell phones facilitates the process.

For the procurement part of the supply chain it is extremely important to have good working, storing and transporting conditions else the possibility of perishability can't be avoided. For the BMC and production plant the use of chemicals as preservatives are important to keep them out of damage but using it above the optimal level could be dangerous and might increase the processing/production costs too. Store display, sales promotions and customer service are some of the important criteria at the customer sales interface especially at the level of retailers. Sales promotions and the customer service to the retailers and the industrial customers these are also some major parameters at the production plant level. Other stakeholders do not have anything to do with these parameters since they are not directly involved with the end users.

Supply chain performance measurement is relatively new and measuring it for the agriculture industry is an extremely difficult task. Further getting direct response from the farmers in this context might be a difficult task in developing countries like India. Unlike foreign countries where corporatisation of agriculture is quite common, farmers or the milk producers in the rural areas of the country do not really understand the business intricacies except the money they earn out of it. Hence measuring the supply chain performance where they are one of the key respondents is becoming difficult further. In this case efficiency, flexibility, responsiveness, product quality and process quality are broadly followed to measure the supply chain performance in the dairy industry. Even though, it is tried to further simplify the indicators and correlated with the various day to day business functions to make the concept broadened and to get clarity. The idea is to see the indicators to go hand in hand with the demographics and day to day business functions. In all cases data relating to cost, time and quality of product/service are used as yardsticks to get ascertained that opinions relating to performance match with their operational figures. The operational figures vary from component to component but strictly adhering to the cost, time and the quality – the major indicators for any business concern.

5. MATERIALS AND METHODS

Case based research supported with survey data is the underlying methodology that has been adopted in this study (Eisenhardt, 1989; Miles & Huberman, 1994; Easton, 1998; Voss, Tsikriktsis, & Frohlich, 2002; Yin, 2003). The case "Orissa State Cooperative Federation (OMFED)", one of the 15 major dairy federations in India, is functioning with support from National Dairy Development Board (NDDB) and other national and international agencies working in the development sector. The study has used data collected from various stakeholders of one of the supply chains of OMFED starting from farmers in the village till the end users in urban areas, mostly. About 1,063 respondents in varied proportions, from each segment as depicted in the table below, have been taken into consideration for collecting data. It may be noted that there are about 10 such supply chains functioning under OMFED meeting the requirements of the customers of entire state of Orissa. Data on the operational variables have been collected from the respective stakeholders with the help of structured questionnaires thus minimizing the use of perceptual data. For an instance "actual expenses of various heads in milk production" are collected from the farmers (mostly from their own records) and collated to draw various inferences. The following section will depict the results and discussions of the dairy-food supply chain performance. Due to data inadequacy in some metrics, the inferences were drawn in a very limited way.

Table 3 Sampling frame with major variables of operation (figures in bracket indicate %)

Sample respondents	Size	Operational variables
Milk producers (MP)	348 (33)	Milk production, sales
Secretaries of dairy cooperative societies (DCS)	168 (16)	Procurement, quality checks, transportation, supporting farmers
Plants-in-charge of bulk milk coolers (BMC)	33 (3)	Procurement, chilling, quality checks, transportation (out-bound logistics)
Production plant officials (PP)	20 (2)	In-bound logistics, procurement, quality checks, production, transportation, distribution, storage in a limited way
Transport agency officials (TA)	20 (2)	Transportation, advance collection
Retailers (RO)	150 (14)	Procurement/purchase, sales
Customers	324 (30)	End consumption, product & service feedback
Total	1063 (100)	Milk production to end consumption

6. RESULTS AND DISCUSSIONS

The supply chain is basically an efficient supply chain where the focus is mostly on cost, profit, RoI and assets. The details are highlighted in the table given below with their suitable metric how they are perceived in the organizations. The results, as the outcome of the survey and observations, have been discussed below. Both from the qualitative and quantitative viewpoints the results have been narrated as per their relevance to a particular variable. Based on SCOR, the major metrics are identified and compared with the superior performers in the manufacturing sector. The possible causes of lower performance of a specific metric are assessed and recommendations have been made to improve them.

Table 4 Supply chain scorecard version 3.0 (performance vs competitive population)

External	Overview metric	SCOR metric	Average*	Superior*	Studied supply chain
	Delivery performance/ quality	Delivery performance to commit date ¹	90%	95%	72%
Internal		Fill rate ²	96%	98%	77%
		Perfect order fulfilment ³	85%	90%	71%
		Order fulfilment lead time (responsiveness) ⁴	5 days	3 days	2 days
	Flexibility and responsiveness	Production flexibility ⁵	25 days	20 days	Scope limited
	Cost	Total logistics management costs ⁶	8%	3%	8.5%
		Value added employee productivity ⁷	\$306K	\$460K	\$11
	Assets	Inventory days of supply ⁸	38 days	22 days	2 days
		Cash- to-cash cycle time ⁹	46 days	28 days	-14 days
		Net asset turns (working capital) ¹⁰	12 turns	19 turns	18 turns

*PRTM (1997) as said in Stephens (Supply Chain Council Report)

¹Delivery performance to commit date = ((total number of orders delivered on the original commitment date) / (total number of orders delivered)) x 100

²Fill rate = ((total no of demand orders met on time from the inventory) / (total demand orders received)) x 100

³Perfect order fulfilment = ((total perfect orders) / (total number of orders)) x 100

⁴Order fulfilment lead time = source cycle time + make cycle time + deliver cycle time (time gap between orders received and orders delivered)

⁵Production flexibility = time required to respond to changing demand conditions to gain or maintain competitiveness

⁶Total logistics management costs = sales – profits – cost to serve (marketing, administrative costs etc.)

⁷Value added employee productivity = sales / total no of employees

⁸Inventory days of supply = the amount of inventory (stock) expressed in days of sales

⁹Cash- to-cash cycle time = inventory days of supply (2) + days sales outstanding (-1) – days payable outstanding (15)

¹⁰Net asset turns (working capital) = sales / total working capital investments

It is seen from the above table that order fulfilment lead time, cash to cash cycle time and net asset turns (working capital) are all at par with the best supply chain performers. Hence in these metrics there is no need to pay any further attention but should be constantly monitored from time to time. All other metrics need attention so as to make them earn better results for the supply chain. Especially, employee productivity, total logistics management costs etc. are some of the key concerns for the dairy-food supply chain being discussed in the case. In this context sub-optimal usage of the capacities of plant machineries and vehicles are some of the major causes behind the lower performance. However, the root cause behind these lower performances can be attributed to the lower procurement and unscientific vehicle routing systems.

7. CONCLUSION

Today, supply chain performance measurement is gaining its importance across industries for identifying the industry's stand in the market place. This identifies the vulnerable areas in the supply chain irrespective of its stakeholders. The item-wise as well as the

component-wise performance detection in the supply chain warn the organisations to take care of certain issues and to get proper alignment among its supply chain partners. The performance measurement of the supply chains will definitely create new avenues for further improvement of itself and its stakeholders. From the view point of efficiency considerations bulk milk coolers, production plant and transporting agencies need to perform better by minimizing the costs. Though minimizing costs at the transporter level might not be an easier task due to high cost of fuels still a judicious planning of the distribution route might help improve their performance in this regard. Responsiveness of the firm, especially of the retail outlets, is also required to perform better in order to strengthen the down-stream supply chain.

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